REMARKS

This application has been reviewed in light of the Office Action dated September 2, 2009. Claims 6 and 47-63 are presented for examination. Claim 6 is the independent claim. Favorable reconsideration is requested.

Claims 6 and 47-63 were rejected under 35 U.S.C. 103(a) as being unpatentable over *Lau et al.* ("Field Emission from Metal-Containing Amorphous Carbon Composite Films", Diamond and Related Materials), Vol. 10, pp. 1727-1731) in view of International Publication No. WO 99/28939 (*Tuck et al.*), and U.S. Patent 5,986,875 (*Hirano et al.*).

Independent Claim 6 recites:

> 6. An electron-emitting device comprising:
>
> a cathode electrode; and
>
> a layer connected to the cathode electrode, wherein
>
> a plurality of groups of particles, each group being constituted by at least two particles which comprise metal as a main component and are adjacent to each other, are arranged in the layer,
>
> the layer comprises as a main component a material which has resistivity higher than resistivity of the particles,
>
> the adjacent two particles are arranged in a range of 5 nm or less, and
>
> one of the adjacent two particles is arranged to be nearer to the cathode electrode than the other particle.

The Office Action alleges as follows:

"With regard to claims 6 and 47-63,

Lau et al. disclose in at least sections 1,2,3 a layer containing carbon (C) having an sp^3 bonding as a main component wherein a plurality of groups of particles (Co, Al, Ti) which are constituted by at least two particles which comprise metal selected from Co, Ni, and Fe as a main component, and are arranged in the layer, each of the particles comprises as a main component a material which has resistivity lower than resistivity of a material of the layer, graphene being arranged between adjacent particles, wherein the particles have an average particle diameter of 1 nm or more to 10 nm or less, wherein surface unevenness of the layer is smaller than 1/10 of its film thickness in rms, wherein the particles comprise monocrystalline metal as a main component, wherein the layer has a

thickness of 100 nm or less, wherein the surface of the layer is terminated with hydrogen." (Emphasis added).

Applicants have carefully reviewed *Lau et al.*, but have not found (in Sections 1, 2 or 3 or elsewhere) any teaching or suggestion of at least (i) particles that have an average particle diameter of 1nm or more to 10 nm or less, (ii) particles that comprise monocrystalline metal as a main component, and (iii) that the surface of a layer is terminated with hydrogen.

Neither does the Office Action specify precisely where in sections 1, 2 and 3 the above features (i)-(iii) allegedly are disclosed.

Therefore, the Office Action is deficient for this reason alone. If the Examiner believes that *Lau et al.* teaches those features, he is respectfully requested to point out specifically where he believes *Lau et al.* teaches them.

Also, the "Response to Arguments" section of the Office Action alleges the following and cites Fig.2b as support.

"While the applicant argues that Lau does not disclose metal particles, the examiner asserts that the metal clusters formed in the film require metal particles to form the clusters. Additionally while the applicant argues that Tuck does not disclose one of two adjacent particles to be arranged nearer the cathode than the other, the examiner respectfully disagrees, drawing the applicant's attention to figure 2b wherein the groups of particles 231 each contain an upper and lower particle the lower particle nearer the cathode than the upper."

However, as can be understood in view of Fig.2b of Tuck, it is NOT a group of a plurality of particles but a single particle that is recognized as corresponding to reference numeral 231 by the Office Action. Further, in Fig.2b, every single particle 231 of the seven particles aligned in a row contacts with the conducting substrate 230. Therefore, all of the seven particles are placed at the same distance from the cathode, and thus Tuck does not disclose or suggest at all that one of the particles is arranged nearer to the cathode than to the other particle.

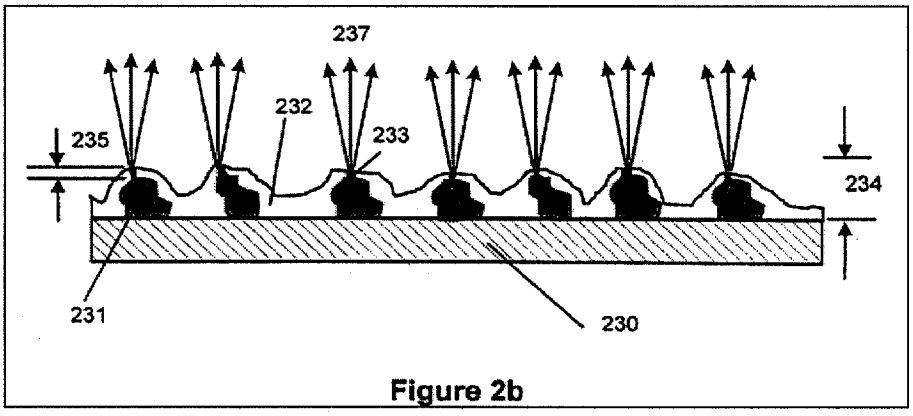

Figure 2b

Furthermore, Tuck discloses as follows (page 16, lines 18-24):

"Figure 2b shows another embodiment of improved material in which particles 231 are in electrical contact with conducting substrate 230 and coated with a layer of insulator 232. The thickness 235 of insulator layer at the upper extremity of each particle 231 is thin relative to the particle height 234 normal to the surface. On application of a suitable electric field conducting channels 233 form at the positions of maximum field enhancement. Electrons 236 are then emitted into the medium 237."

It is clear from the above description that the member 231 referred to by the Office Action is a single particle and thus NOT a group of a plurality of particles.

Further, Claim 6 recites "... the adjacent two particles are arranged in a range of 5 nm or less, ..." The specification (U.S. Patent Application Publication No.US2006/0066199, [0089]) describes the technical significance of the feature that the distance between the particles is within the range of 5nm or less, as follows. (Of course,

the example embodiment therein is referred to for purposes of illustration only, and the claimed invention should not be limited only to the details thereof.)

"[0089] In addition, in the present invention, the adjacent particles are preferably arranged within a range of 5 nm or less. When this range is exceeded, the threshold value for electron emission starts to increase extremely and it also becomes difficult to obtain a sufficient emission current. Further, in the respective aggregates (groups of particles), the adjacent particles 3 may be in contact with each other. It is not desirable that the distance among the particles 3 exceeds the average particle diameter thereof because the electric field concentration is less likely to occur. In addition, as in the present invention, since the conductor contained in the layer 2 is a particulate, even if the adjacent particles are in contact with each other, resistance between the adjacent particles increases. Thus, it is surmised that extreme increase in an emission current at individual electron emission site existing in the layer 2 can be suppressed, and electron emission can be performed stably."

As mentioned above, the feature that the distance between the particles is within the range of 5nm or less is not a mere design matter, but has technical significance. None of the cited documents discloses or suggests this distance between the particles.

Indeed, nothing in either Lau et al. or Tuck et al., would teach or suggest the above-emphasized recitations of Claim 6. As such, Claim 6 is clearly patentable over those references, whether considered separately or in combination.

A review of the other art of record, including Hirano, has failed to reveal anything which, in Applicants' view, is understood to remedy the above-noted deficiencies of the mentioned art, as references against Claim 6 herein. Accordingly, that claims is believed patentable over the art of record.

The other claims depend from Claim 6, and also are believed to be clearly patentable for the same reasons as is that independent claim. Since each dependent claim is also deemed to recite an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request early and favorable consideration and passage to issue of this application.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

Frank A. DeLucia
Attorney for Applicants
Registration No. 42,476

FITZPATRICK, CELLA, HARPER & SCINTO
1290 Avenue of the Americas
New York, New York 10104-3800
Facsimile: (212) 218-2200

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